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| AKERMAN SENTERFITT | | | EXAMINER | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,384

Applicant(s)

VENSTRA, WARNER JURRIEN

Examiner

WALTER H. SWANSON

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-7, 9-13 and 23-26 is/are rejected.
7) ☒ Claim(s) 8 and 14-22 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 21 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 06/19/2006
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the Netherlands on 3 May 2004.

Oath/Declaration

2. Acknowledgment is made of applicant's declaration filed on 11 December 2006.

Information Disclosure Statement

3. The information disclosure statement filed on 19 June 2006 complies with 37 CFR 1.98(a)(2).

Preliminary Amendment

4. The preliminary amendment filed on 21 September 2005 complies with 37 CFR 1.98(a)(2).

Drawings

5. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because of the following reason:

In FIG. 12, the reference characters indicating the perforated silicon membrane and the silicon wafer are both 1. To avoid confusion, the examiner suggests the reference character 1' to indicate the perforated silicon membrane.

In FIG. 16, the reference character 36 is not shown. To avoid confusion, the examiner suggests that arrow 37 be relabeled as arrow 36.

Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

6. Applicant is reminded of the proper language and format for an abstract of the disclosure:

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as “means” and “said,” should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The current abstract contains 188 words.

Claim Rejections – 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-7 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara et al. (Japanese Laid-Open Patent Application 2002-244053; hereinafter, “Hara”).

Regarding claim 1:

Hara discloses a method for the fabrication of a membrane oriented in a (111) plane of a (100) silicon wafer, comprising the steps of:

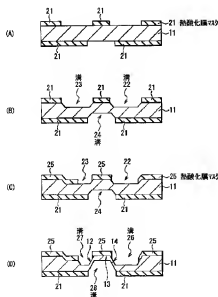
applying a masking layer (21, 25) to both sides of the wafer (11), wherein portions of the sides are covered by the masking layer (col. 8, para. [0024]); and

removing at least partial removal by etching away silicon material from the portions of the two sides of the wafer that are not covered, wherein the etching step substantially removes the silicon material

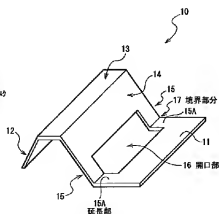
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forming recesses (22, 23, 24, 26, 27, 28) in the two surfaces of the wafer, such that the walls of the recesses are formed by (111) planes (12, 14), wherein not covered portions at both sides of the wafer are aligned in relation to one another such that a (111) plane formed from a first side is oriented parallel to a (111) plane formed from a second side, and the distance d between said two planes is less than the thickness of the silicon wafer, so as to form a membrane in the (111) plane having a thickness d , and wherein at least one through-opening (16 in FIG. 2) is formed by an etching treatment in the membrane oriented in the (111) plane only, with the opening being oriented substantially perpendicularly in relation to the (111) plane (cols. 8-10, paras. [0025]-[0032], FIGS. 2, 4(A)-(D)). Hara discloses the claimed invention except for forming the through-opening in the membrane oriented in the (111) plane only. It would have been an obvious matter of design choice to form the through-opening in the membrane oriented in the (111) plane only, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

【図4】



【図2】



Regarding claim 2:

Hara discloses a method according to claim 1, wherein into both sides of the wafer V-shaped recesses are etched, wherein the lowest point in a V-shaped recess in a first side is positioned adjacent to a not covered portion at the other side of the wafer (FIG. 4(D)).

Regarding claim 3:

Hara discloses a method according to claim 1, wherein a recess in a first side reaches up to the masking layer at the second side (Hara discloses the claimed invention except for a recess in a first side reaches up to the masking layer at the second side. It would have been an obvious matter of design choice to form the recess in a first side so that it reaches up to the masking layer at the second side, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Regarding claim 4:

Hara discloses a method according to preceding claim 1, wherein the thickness d is measured and the etching step is continued to etch the (111) planes until a desired thickness d is attained (col. 8, para. [0025]).

Regarding claim 5:

Hara discloses a method according to claim 1, wherein after the completion of the etching step, the masking layer is removed (FIG. 2).

Regarding claim 6:

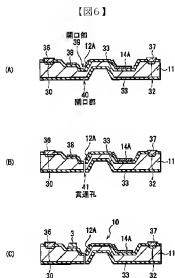
Hara discloses a method according to claim 1, wherein said step comprises providing a longitudinal opening that extends through the membrane formed in the (111) plane, wherein the opening extends from the free end of the membrane into the direction of a position where the membrane is attached to the wafer (FIG. 2).

Regarding claim 7:

Hara discloses a method according to claim 1, wherein the through-opening is formed by an etching treatment, preferably by means of a dry-etching treatment, preferably a plasma etching treatment (high density plasma formed by alternating C_4F_8 and SF_6 gases – col. 10, para. [0032]).

Regarding claim 9:

Hara discloses a method according to claim 1, wherein at least two parallel longitudinal openings are formed, oriented substantially perpendicular in relation to the line where the formed membrane is attached to the wafer, so as to form at least one cantilever (FIG. 6 (B)).

*Regarding claim 10:*

Hara discloses a membrane for orientation in a (111) plane of a (100) silicon wafer obtained by a method comprising the steps of:

applying a masking layer (21, 25) to both sides of the wafer (11), wherein portions of the sides are covered by the masking layer; and

removing at least partially by etching away silicon material from the portions of the two sides of the wafer that are not covered,

wherein the etching step substantially removes the silicon material forming recesses (22, 23, 24, 26, 27,

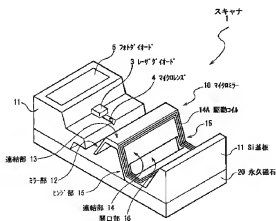
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28) in the two surfaces of the wafer, such that the walls of the recesses are formed by (111) planes (12, 14), wherein not covered portions at both sides of the wafer are aligned in relation to one another such that a (111) plane formed from a first side is oriented parallel to a (111) plane formed from a second side, and the distance d between said two planes is less than the thickness of the silicon wafer, so as to form a membrane in the (111) plane having a thickness d , and wherein at least one through-opening (16 in FIG. 2) is formed by an etching treatment in the membrane oriented in the (111) plane only, with the opening being oriented substantially perpendicularly in relation to the (111) plane (cols. 8-10, paras. [0025]-[0032], FIGS. 2, 4(A)-(D)). Hara discloses the claimed invention except for forming the through-opening in the membrane oriented in the (111) plane only. It would have been an obvious matter of design choice to form the through-opening in the membrane oriented in the (111) plane only, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Regarding claim 11:

Hara discloses an application of a membrane according to claim 10 in a scanning element of a scanning element microscope, scanning probe microscope, or a friction force microscope (FIG. 1).

【図1】

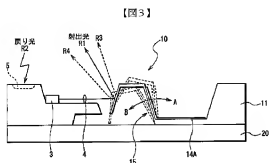


Regarding claim 12:

Hara discloses an application of a membrane according to claim 10 in a mirror (10) (FIG. 1).

Regarding claim 13:

Hara discloses an application of a membrane according to claim 10, wherein a first surface of the (111) plane forms a reflecting surface and the other surface comprises a position-modifying means (FIG. 3).

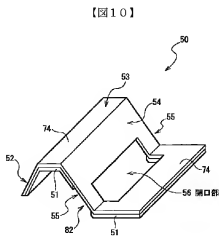
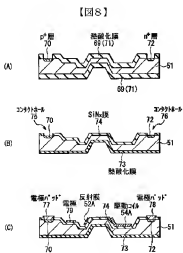


9. Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara et al. (Japanese Laid-Open Patent Application 2002-244053; hereinafter, “Hara”).

Regarding claim 23:

The first embodiment of Hara is **silent** regarding applying a material that exhibits a different etching behaviour than silicon onto the membrane.

Another embodiment of Hara **teaches** applying a material (74) that exhibits a different etching behaviour than silicon onto the membrane (FIGS. 8(A)-(C), 10).



It would have been obvious to one of ordinary skill in the art to apply a material that exhibits a different etching behaviour than silicon onto the membrane as taught by Hara. This is so because the thickness of the CVD-applied material (SiN_x) is easier to control than the thickness of a portion of the silicon substrate. The thinner SiN_x is used to form a hinge instead of a portion of the silicon substrate. This allows the SiN_x hinge to open to a wider angle than the hinge made of a portion of the silicon substrate (see Hara col. 13, para. [0047]). Furthermore, it would have been obvious because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. ___, 82 USPQ2d 1385 (2007). “If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person’s skill.” *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. ___, 82 USPQ2d 1385 (2007).

Regarding claim 24:

Another embodiment of Hara discloses a method according to claim 23, wherein the layer of the material is applied over at least a portion of the silicon membrane's surface (FIGS. 8(A)-(C), 10).

Regarding claim 25:

Another embodiment of Hara discloses a method according to claim 23, wherein the material forming the layer (74) is selected from silicon nitride, silicon oxide or silicon carbide (FIGS. 8(A)-(C), 10).

Regarding claim 26:

Another embodiment of Hara discloses an application of a membrane obtained by the method according to claim 23, wherein the layer of the material is electrically conductive and has an elongated

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shape from a first connection point to a second connection point, and forms a heating element, and is connected at the two connecting points to a power source (FIGS. 8(A)-(C), 10).

Claims 1-7, 9-13, and 23-26 are rejected. Claims 8 and 14-22 are objected to as being dependent upon a rejected base claim

Allowable Subject Matter

10. Claims 8 and 14-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of allowable subject matter:

Claims 8 and 14-22 would be allowable primarily because the limitations in claims 8 and 14-22 when combined with claims 1, 10, and 20 cannot be fairly suggested by the references of record.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter H. Swanson whose telephone number is (571) 270-3322. The examiner can normally be reached on Monday to Thursday from 8:00 to 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Walter H. Swanson/
22 April 2008

/W. David Coleman/
Primary Examiner, Art Unit 2823